191. **Proposed by J. EDWARD SANDERS, Reinersville, Ohio.**

Two random lines cut a given circle. What is the chance that they intersect within the circle?

Solution by HENRY HEATON, Belfield, N. D., and the PROPOSER.

Let x=the distance of one of the lines from the center of the circle, and θ=the angle between the lines. The length of the part of the first line lying within the circle is $2\sqrt{(a^2-x^2)}$. For given values of x and θ the chance of intersection is

$$\frac{2\sin\theta\sqrt{(a^2-x^2)}}{2a}=\frac{\sin\theta}{a}\sqrt{(a^2-x^2)},$$

and the required chance is

$$P=\int_0^a\int_0^{\frac{1}{2}\pi}\frac{\sin\theta}{a}\sqrt{(a^2-x^2)}dx\,d\theta\div\int_0^a\int_0^{\frac{1}{2}\pi}dx\,d\theta=\frac{2}{a\pi}\int_0^a\sqrt{(a^2-x^2)}dx=\tfrac{1}{2}.$$

Also solved by G. B. M. Zerr, who gets ⅛ for the result. His solution will be published in the next issue of the MONTHLY.

PROBLEMS FOR SOLUTION.

ALGEBRA.

293. **Proposed by C. E. WHITE, Vanderbilt University, Nashville, Tenn.**

Prove by mathematical induction that $\frac{(x-a)^{m-1}}{(m-1)!}f^{m-1}(a)+\frac{(x-a)^{m-2}}{(m-2)!}$ $+\ldots\frac{(x-a)^2}{2!}f''(a)+(x-a)f'(a)+f(a)$ will be the remainder when $f(x)$ is divided by $(x-a)^m$.

294. **Proposed by O. L. CALLECOT, Gettysburg, S. Dak.**

Find the limit of $\sum_{n=1}^{n=\infty}\frac{2(n^2+3n+3)}{n(n+1)(n+2)(n+3)}$.

GEOMETRY.

326. **Proposed by L. E. NEWCOMB, Los Gatos, Calif.**

The circle C of radius pR encloses the circles A_1B_1 of radii R and $(p-1)R$, respectively; the circle B_1 is tangent to $A_1B_1C_1$; the circle B_2 is tangent to AB_1C; the circle B_3 to AB_2C, ..., B_n to $AB_{n-1}C$. Find the radius of the circle B_n.